



Environment, Health & Safety Division

January 10, 2007

DIR07-008

To: Daniel M. Neumark
Chemical Sciences Division Director

From: Howard K. Hatayama *H*
Environment, Health and Safety Division Director

Subject: 2006 Chemical Sciences Division Integrated Functional Appraisal

The Environment, Health and Safety Division conducted a triennial Integrated Functional Appraisal (IFA) of the Chemical Sciences Division during the period of June through August 2006. The IFA team focused on work that involves higher or special hazards, formal authorizations, and permits.

The Chemical Sciences 2006 IFA Report is enclosed. It presents the IFA results and a description of the appraisal process.

The appraisal determined that the Chemical Sciences Division maintains a high level of authorization compliance. One Finding (non-compliance with a standard or policy) and four Observations were noted for Activity Hazard Documents and no Findings and four Observations were noted for Radiological Work Authorizations. IFA findings are to be tracked to completion in the Lab's Corrective Action Tacking System.

Your IFA Team Leader, Dave Rodgers, is available to answer any questions (x7675).

cc: Jerry Bucher
Dave Rodgers

Lawrence Berkeley National Laboratory

Chemical Sciences Division



2006 Integrated Functional Appraisal

IFA Team Members

	Signature	Date
<u>David Rodgers</u> IFA Team Leader - EH&S		<u>12/22/2006</u>
<u>Jerry Bucher</u> Chemical Sciences Division Safety Coordinator		<u>1/4/2007</u>
<u>Chris Donahue</u> EH&S Subject Matter Expert: Radiological Control Manager		<u>01/10/07</u>
<u>Maram Kassis</u> EH&S Subject Matter Expert: Hazardous Waste	 M. Kassis	<u>12/27/06</u>
<u>John Seabury</u> EH&S Subject Matter Expert: Industrial Hygiene		<u>01-10-2007</u>
<u>David Kestell</u> EH&S Subject Matter Expert: Radiation Protection (Sealed Sources)		<u>01/10/07</u>

Executive Summary

The 2006 Integrated Functional Appraisal (IFA) of the Chemical Sciences Division (CSD) of Lawrence Berkeley National Laboratory focused on the division's formal authorizations for hazardous work operations. The emphasis was on compliance with the requirements specified in the authorizations, as well as in the foundation regulations underlying the authorizations. Authorizations for which laser operations are the primary hazard were not included, as they were reviewed under a separate program this year. Hazardous waste generator accumulation areas were included even though these are not formal authorizations.

The designated Principle Investigators (PI's) for the authorizations were the primary contacts for all interviews and appraisals. All lab areas and operations specified in the authorizations were inspected.

The appraisal determined that CSD maintains a high level of authorization compliance. A small number of minor non-compliances were observed, but most were for administrative issues and none were determined to be a significant safety concern.

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1 Introduction

The Integrated Functional Appraisal (IFA) is a key component of Lawrence Berkeley National Laboratory's (LBNL's) integrated safety management (ISM) system, and forms one of the three tiers of LBNL's Environment, Safety and Health (ES&H) self-assessment program. The Environment, Health and Safety (EH&S) Division conducts an IFA for each Laboratory division every three years. The current IFA took place during June through August of 2006.

1.1 Laboratory Management IFA Oversight

The EH&S Division and Office of Contract Assurance jointly oversee the implementation of the IFA. In response to changing Laboratory program audit needs, a steering committee was formed to assure that maximum audit effectiveness is achieved. The IFA Steering Committee members are listed in **Figure 1**.

Figure 1 2006 IFA Steering Committee

Member	LBNL Organization
Michelle Flynn	Office of Contract Assurance (OCA) – Chair
John Chernowski	OCA
Paul Blodgett	EH&S - Industrial Hygiene
Jack Salazar	EH&S – Liaison Coordinator
Richard DeBusk	EH&S - Occupational Safety
Ross Fisher	EH&S - IFA Coordinator

Some restructuring of the IFA process for this year was initiated whereby:

- The IFA included hazardous work¹ program compliance
- Laser-based hazard authorizations were not included in the scope
- Line management authorized work and non-technical work were de-emphasized
- Details of formal work authorizations and hazardous work permits were audited.

1.2 IFA Purpose

¹ Work conducted under special hazardous work authorization or permits such as lock-out-tag-out, energized work, confined space work, surface penetration, fire safety, hoisting and rigging activities, ultra-centrifuge use, etc.

The purpose of the IFA is to conduct a technical environmental and occupational safety and health audit and physical inspection of a division's hazardous operations, and the controls and programs used to mitigate the identified hazards. The appraisal evaluates compliance with federal, state and local regulation, and with LBNL policy. The IFA process also provides an Operational Awareness window for LBNL's Berkeley Site Office DOE program liaisons.

1.3 Scope

The primary focus of the appraisal was directed toward work conducted under formal authorizations and hazardous work permits. Chemical Sciences Division (CSD) does work under the following types of formal authorizations: Radiological Work Authorization (RWA), Activity Hazard Document (AHD), Sealed Source Authorization (SSA) and various Hazardous waste generator accumulation Areas. AHD's for which the primary hazard is laser operation are not included in this IFA as they are being inspected under a separate program this year.

2 Appraisal Process

2.1 Team

2.1.1 Team selection

The IFA team is shown on the second page of this report. Jerry Bucher, as the CSD Safety Coordinator, participated in all aspects of the review. Chris Donahue, as the Radiological Control Manager (RCM), was selected for the RWA reviews. Maram Kassis is the Waste Generator Assistant for CSD and as such was selected for the inspection of accumulation areas for waste. David Kestell is the Radiation Protection Group (RPG) Sealed Source Manager and was selected for the SSA inspection. John Seabury is the Industrial Hygienist that approves all the CSD AHD's. Kim Abbott of the Berkeley Site Office (BSO) Field Program Representative for Basic Energy & Computing Sciences, which includes CSD.

2.1.2 Team member roles and responsibilities

The IFA team leader was responsible for the following: compiling the IFA team; managing the retrieval of all pertinent documents; defining the scope of the IFA with the assistance of the division safety coordinator; coordinating meetings; communicating results to the appraised division; and preparing the IFA report. The IFA team member SMEs are responsible for reviewing applicable documents with respect to their field of expertise reporting any ES&H concerns they identify, regardless of

their field of expertise. Each SME lead the inspections and interviews for their area of expertise.

2.1.3 Team meetings

Appendix A shows a summary of team meetings. For the RWA meeting, the team met with CSD personnel to discuss the scope of the review and general issues regarding the RWA's. After the meeting the lab areas covered by the RWA's were inspected.

For the AHD meeting, the team met with CSD personnel to discuss the scope of the review and general issues regarding the AHD's. After the meeting the lab areas covered by the AHD's were inspected.

The SAA/MWSAA/RWCA results and SSA inspections and interviews were combined at the activity locations.

2.2 Planning the Appraisal

2.2.1 Documentation and database reviews

Various sources were used to identify the formal authorizations covering work in CSD. Appendix B. shows the specific authorizations that were identified. As indicated earlier, laser AHD's were not included in the scope and therefore are not listed.

Copies of the listed authorization documents were gathered and reviewed. The SAA/MWSAA/RWCA results documentation consisted only of a listing of the locations and owners.

2.2.2 Identification of operations

CSD has hazardous work authorizations of four types: Activity Hazard Document (AHD) (17), Radiological Work Authorization (RWA) (6), Radiological Work Authorization (RWP) (1) and Sealed Source Authorization (SSA) (1). Additionally, CSD maintains 37 areas for waste accumulation including Satellite Accumulation Area (SAA), Mixed Waste Satellite Accumulation Area (MWSAA) and Radioactive Waste Collection Area (RWCA.) The bulk of the AHD's have lasers as the primary hazard and were not covered by this IFA as they were evaluated under a separate program. Three AHD's were not laser related and were reviewed. Appendix C lists the areas and authorizations inspected.

2.3 Interviews and Field Audits

The interviews and field audits conducted are listed in Appendix A. At the interviews for the RWA's and AHD's, the authorization documents were discussed with the Principle Investigators (PI's), focusing on authorized users, training, scope of work, operational/hazard status and

renewal status. The PI's are listed in Appendix B. After the interviews, field inspection of the work areas were performed.

- 2.3.1 RWA/RWP field inspections – The lab areas used for RWA work were inspected with the PI's. The inspections were based on the RWA appraisal checklist and requirements specified in EHS Procedure 707 (RWA program), PUB-3000- Chapter 21 (Radiation Safety) and 10CFR835. The Radioisotope Journals (RIJ's) were reviewed for completeness for such items as training status, user survey documentation, operating procedures and radioactivity inventory. Also inspected were required area postings and labeling, contamination control, user knowledge and waste handling. The checklists used for the inspections are shown in Appendices D5 through D11.
- 2.3.2 AHD field inspections – The locations for the AHD work were inspected with the PI's as documented in the checklists. General workplace safety issues were reviewed in addition to the specific requirements and hazards associated with the AHD's. The checklists used for the inspections are shown in Appendices D1, D2 and D3.
- 2.3.3 SAA/MWSAA/RWCA field inspections – All SAA/MWSAA/RWCA's were inspected along with the responsible user. Each area was inspected for proper posting, container labeling, container age, storage status, chemical segregation and general housekeeping. The checklist used for the inspections is shown in Appendix D4.
- 2.3.4 Sealed Source Authorization field inspection – SSA-210 was inspected by David Kestell, the RPG Sealed Source Coordinator, with the P.I. at Beamline 9.0.2 at the ALS. The SSA document was reviewed, along with the user training records, required posting and labeling, source inventory, annual leak tests, and compliance reviews. The checklist used for the inspection is shown in Appendix D12.

3 Results

- 3.1 **RWA/RWP/SSA results** – The authorizations and permit are current and authorized users have received radiation worker training as required. All authorized work and storage areas were properly posted, with the exception of one out-of-date storage label on the freezer in 70A-2211. This was immediately corrected. Housekeeping was very good generally, however housekeeping in 70A-2211 was noted as needing attention and the PI was informed. The Radioisotope

Journals (RIJs) were reviewed for each project and all required records were on file at the time of the walkthrough. However, it was noted that an out-of-date RIJ coversheet was in use in RWA 1113 (Lukens). The RCT assigned to this project has since provided a current RIJ coversheet with correct contact phone numbers.

Pat Durbin, PI for RWA 1040, was not available to participate in the laboratory walkthrough. The CSD Safety Coordinator, Jerry Bucher, was very familiar with her work and was able to locate the RIJ for review. Questions were raised about the inventory found in a refrigerator as compared with the log in the RIJ and Bucher was able to answer questions about current and past use of the material at a level necessary for assessment. Bucher's level of familiarity with the research performed in the various labs enhances his effectiveness as a Division Safety Coordinator.

These results are summarized in Appendix E3.

3.2 AHD results – A summary of the observations and findings is shown in Appendix E2. and comments are below:

The single finding, for AHD 2069, is an administrative issue in that the unreviewed change made to the AHD would have been approved if requested, since the change did not affect the level of hazard of the AHD and such a change is specifically allowed by the AHD (with approval.) This issue reflects general documentation and administration problems with the entire manual AHD system at LBNL as much as an administrative oversight by CSD personnel. Over the next year, all CSD AHD's will be migrated to the new electronic AHD database and problems of this type should be greatly reduced.

Two of the 4 observations are related to the implementation of the new electronic AHD database. The conversion of all CSD AHD's to this system over the next year will be a major improvement to the AHD process.

3.3 SSA results – The SSA review found that all requirements were up-to-date and correct.

3.4 SAA/MWSAA/RWCA results - In general the areas are well maintained with only minor administrative issues as noted. Specific deficiencies were discussed with the Division.

4 Corrective Action Tracking and Follow-up

AHD 2069 – unreviewed change in list of gases (see App E2)

Verbal approval of the change was made by EHS. The AHD is currently in revision in the new AHD database and final approval of the revision by EHS will close this issue. A CATS item #2982 has been opened to formalize this requirement.

RWA 1140 – RSA label out updated.

This issue was resolved by the P.I. updating the label on the refrigerator. No CATS item was opened.

5 Conclusions

In general, the CSD PI's responsible for the authorizations reviewed for this IFA exhibit appropriate respect for the formal authorization process and put a high priority on safety. This has lead to a very low incidence of authorization violations over the past few years and an excellent safety record for the operations conducted under these authorizations.

The new AHD database system should be a significant help for the PI's in keeping AHD's accurate and up-to-date. Implementation has just begun but all AHD's should be in the system by the end of 2007.

CSD is conducting quarterly walkthroughs of all areas for accumulating waste (SAA/MWSAA/RWCA) in coordination with their waste generator assistant from the HWHF. With such a large number of accumulation areas in the division, this program has been very effective in assuring compliance.

6 Appendices

Appendix A IFA Team Meetings, Inspections and Interviews

Appendix B IFA Documentation Reference Sheet

Appendix C Operations and Areas Inspected

Appendix D IFA Field Inspection Guide

Appendix E Findings and Observations

Appendix A IFA Team Meetings, Inspections and Interviews

Date	Topic	Attendees
6/21/2006	RWA interviews and inspections	Dave Rodgers (EHS) Jerry Bucher (CSD DSC) Chris Donahue (EHS RPG) David Shuh (CSD) Wayne Lukens (CSD) Linfeng Rao (CSD)
7/13/2006	SSA Inspection	Dave Rodgers (EHS) Jerry Bucher (CSD DSC) David Kestell (EHS, RPG) Kevin Wilson (CSD)
7/27/2006	SAA interviews and inspections	Dave Rodgers (EHS) Jerry Bucher (CSD DSC) Maram Kassis (EHS HWHF) Wayne Lukens (CSD) David Shuh (CSD) Jason Maddi (CSD) Linfeng Rao (CSD) Chris Howle (CSD) Yaroslav Romanyuk (CSD)
8/2/2006	AHD interviews and inspections	Dave Rodgers (EHS) Jerry Bucher (CSD DSC) John Seabury (EHS IH) Kim Abbott (BSO) Wayne Lukens (CSD) David Shuh (CSD)

Appendix B IFA Documentation Reference Sheet

DOCUMENT TYPE/TITLE	Reference (Doc #, dates, etc.)
Facility Permits / Authorizations	
Safety Analysis Documents (SADs) Final Safety Analysis Documents (FSADs)	n.a.
Discharge permits (sewer, storm water, air)	n.a.
NEPA/CEQA documents	n.a.
Formal Work Authorizations	
Activity Hazard Documents (AHDs)	AHD 2026 <i>Handling Alkali and Alkaline Earth Metal Compounds and Reactive Hydrides</i> (Wayne Lukens)
	AHD 2069 <i>Working with Hazardous Gasses in Fume Hoods</i> (Wayne Lukens)
	AHD 3022 <i>Use and Care of 300 MHz NMR Spectrometer in 70A-2215</i> (Wayne Lukens)
Radiological Work Authorizations (RWAs)	RWA 1020 (70A David Shuh)
	RWA 1040 (70A Pat Durbin-Heavey)
	RWA 1112 (70A Linfeng Rao)
	RWA 1113 (70A Wayne Lukins)
	RWA 1117 (70A David Shuh)
	RWA 1148 (ALS BL7.0 David Shuh)
Radiological Work Permits (RWPs)	RWP-06-004 (70A David Shuh)
General License Authorizations (GLAs)	n.a.
Sealed Source Authorizations (SSAs)	SSA 210 (ALS BL 9.0.2, Kevin Wilson)
X-ray Authorizations (XAs)	n.a.
Human Subjects	n.a.
Biological Use Authorizations/Registration	n.a.
Waste Management Group information on Satellite Accumulation Areas (SAAs) and Waste Accumulation Areas (WAAs)	37 SAA's (see Appendix E.)
Hazardous Work Authorization / Permits	
Confined Space Permit	n.a.
Energized Work Permit (A and B)	n.a.
Fire Safety Permit	n.a.
Lock Out Tag Out	n.a.
Surface Penetration Permit	n.a.
Ultracentrifuge Use	n.a.

 IFA Team Leader Signature

 Date

Appendix C Operations and Areas Inspected

[illegible]

Appendix D IFA Field Inspection Guides

Appendices D1 – D3	AHD inspections (CSDIFA06 App D1-3_AHD.pdf)
Appendices D5 – D10	RWA inspections (CSDIFA06 App D5-12_Rad_Auth.pdf)
Appendix D11	RWP inspection (CSDIFA06 App D5-12_Rad_Auth.pdf)
Appendix D12	SSA inspection (CSDIFA06 App D5-12_Rad_Auth.pdf)

Chemical Sciences Division 2006 IFA - Appendix D1 Field Inspection Guide

Authorization Type: Activity Hazard Document

Date: 8/2/2006

Location(s): 70A-2211, 2217

Authorization Number/Reference: AHD 2026

Reactive Metals

REVIEWED

Administrative	Yes	No	Not Obs/App	
Authorization approved and signed	X			1
Authorization current	X			
All users listed on authorization	X			
All users trained in accordance with authorization requirements	X			
Authorization accurately reflects work being conducted		X		
Authorization posted / available in work area	X			
Other:				
Hazardous Work Permits				
Confined Space Permit			X	
Energized Work Permits (EWP - A, B)			X	
Fire Safety Permit			X	
Lock Out Tag Out (LOTO)			X	
Energized Work Permits (EWP - A, B)			X	
Permit to Penetrate Surface			X	
Work Area Occupational and Environmental Safety and Health				
Access and egress	X			
Biohazards			X	
Chemical Hygiene and Safety	X			
Chemical Management System status	X			
Compressed gasses	X			
Confined space			X	
Cryogenic	X			
Electrical	X			
Energy	X			
Ergonomic considerations			X	
Exit Routes, Emergency Action Plans, and Fire Prevention Plans	X			
Elevated locations and guarding			X	
Lasers			X	
Lead			X	
Machine tools			X	
PPE	X			
Pressure			X	
Soldering			X	
Thermal			X	
Walking and working surfaces	X			
Welding			X	
Other Hazards:			X	
Radiation Protection				
Radioisotope Journal up to date			X	
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			X	
Exposure Control: shielding, dosimetry, PPE, food/drink			X	
Posting & Labeling: rooms, sinks, equipment			X	

Chemical Sciences Division 2006 IFA - Appendix D1 Field Inspection Guide

REVIEWED

Equipment Authorization - Certification/calibration/logs

	Yes	No	Not Obs/App
Autoclave			X
Biosafety Cabinet			X
Clean Room			X
Crane Hoist			X
Eyewash / Safety Shower	X		
Fire Extinguishers (incl. Class D)	X		
Flammables Cabinet/Refrigerator	X		
Fork Lift / Heavy Equipment Operator			X
Fume Hood (calibration check up to date)	X		
Glove Box (calibration check up to date)	X		
Hand and Shoe Counter			X
Local Exhaust System			X
Monitoring / Alarm System			X
Photoprocessing Equipment			X
Sonicator			X
Ultracentrifuge			X
Other			X

Waste Management

WAA compliance			X
SAA compliance (previously audited by LBNL Waste Mgmt)	X		

Environmental Services

Air emissions	X		
Sanitary sewer discharge	X		
Storage tanks - aboveground or underground			X
Storm water management			X
Treatment systems			X

Field Interviews

Knowledge of authorizations, procedures, etc.	X		
Knowledge of safety systems	X		
On-the-job training	X		
Safety concerns, how to communicate concerns	X		

Comments

1. Observation: Sand technique for deactivating sodium not listed on AHD, although it had been discussed with EH&S

OVERALL: AHD in compliance

Performed By: John Seabury

Name / Signature

Date: 8/2/06

Reviewed By: David Rodgers

Name / Signature IFA Team Leader

Date: 9/11/2006

Chemical Sciences Division 2006 IFA - Appendix D2 Field Inspection Guide

Authorization Type: Activity Hazard Document

Date: 8/2/2006

Location(s): 70A-2211, -2217

Authorization Number/Reference: AHD 2069

Health Hazard Gases

REVIEWED

Administrative

	Yes	No	Not Obs/App
Authorization approved and signed	X		
Authorization current	X		
All users listed on authorization	X		
All users trained in accordance with authorization requirements	X		
Authorization accurately reflects work being conducted	X		
Authorization posted / available in work area	X		
Other:			

1,2

Hazardous Work Permits

Confined Space Permit			X
Energized Work Permits (EWP - A, B)			X
Fire Safety Permit			X
Lock Out Tag Out (LOTO)			X
Energized Work Permits (EWP - A, B)			X
Permit to Penetrate Surface			X

Work Area Occupational and Environmental Safety and Health

Access and egress	X		
Biohazards			X
Chemical Hygiene and Safety	X		
Chemical Management System status	X		
Compressed gasses	X		
Confined space			X
Cryogenic	X		
Electrical	X		
Energy	X		
Ergonomic considerations			X
Exit Routes, Emergency Action Plans, and Fire Prevention Plans	X		
Elevated locations and guarding			X
Lasers			X
Lead			X
Machine tools			X
PPE (Mandatory safety glasses)	X		
Pressure			X
Soldering			X
Thermal			X
Walking and working surfaces	X		
Welding			X
Other Hazards:			X

Radiation Protection

Radioisotope Journal up to date			X
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			X
Exposure Control: shielding, dosimetry, PPE, food/drink			X
Posting & Labeling: rooms, sinks, equipment			X

Chemical Sciences Division 2006 IFA - Appendix D2 Field Inspection Guide

		REVIEWED	
Equipment Authorization - Certification/calibration/logs	Yes	No	Not Obs/App
Autoclave			X
Biosafety Cabinet			X
Clean Room			X
Crane Hoist			X
Eyewash / Safety Shower	X		
Fire Extinguishers (incl. Class D)	X		
Flammables Cabinet/Refrigerator	X		
Fork Lift / Heavy Equipment Operator			X
Fume Hood (calibration check up to date)	X		
Glove Box (calibration check up to date)	X		
Hand and Shoe Counter			X
Local Exhaust System			X
Monitoring / Alarm System			X
Photoprocessing Equipment			X
Sonicator			X
Ultracentrifuge			X
Other			X
Waste Management			
WAA compliance			X
SAA compliance (previously audited by LBNL Waste Mgmt)	X		
Environmental Services			
Air emissions	X		
Sanitary sewer discharge	X		
Storage tanks - aboveground or underground			X
Storm water management			X
Treatment systems			X
Field Interviews			
Knowledge of authorizations, procedures, etc.	X		
Knowledge of safety systems	X		
On-the-job training	X		
Safety concerns, how to communicate concerns	X		
Comments			
<p>1. *FINDING* HCl, HBr added to AHD as covered gases but this was never reviewed by EH&S. This is a change in scope that was not reviewed.</p> <p>2. Observation: Extra health hazard gases not listed on AHD, not in use, should be disposed of.</p> <p>Overall: AHD in compliance except for indicated finding.</p>			
<p>Performed By: John Seabury _____ Date: 8/2/06</p> <p style="text-align: center;">Name / Signature</p> <p>Reviewed By: David Rodgers _____ Date: 9/11/2006</p> <p style="text-align: center;">Name / Signature IFA Team Leader</p>			

Authorization Type: Activity Hazard Document

Date: 8/2/2006

Location(s): 70A-2215

Authorization Number/Reference: AHD 3022

NMR Spectrometer

REVIEWED

Administrative	Yes	No	Not Obs/App	
Authorization approved and signed	X			1
Authorization current	X			
All users listed on authorization	X			
All users trained in accordance with authorization requirements	X			
Authorization accurately reflects work being conducted	X			
Authorization posted / available in work area	X			
Other:				
Hazardous Work Permits				
Confined Space Permit			X	2
Energized Work Permits (EWP - A, B)			X	
Fire Safety Permit			X	
Lock Out Tag Out (LOTO)			X	
Energized Work Permits (EWP - A, B)			X	
Permit to Penetrate Surface			X	
Work Area Occupational and Environmental Safety and Health				
Access and egress	X			2
Biohazards			X	
Chemical Hygiene and Safety	X			
Chemical Management System status		X		
Compressed gasses	X			
Confined space			X	
Cryogenic	X			
Electrical	X			
Energy	X			
Ergonomic considerations (operator workstation)	X			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans	X			
Elevated locations and guarding			X	
Lasers			X	
Lead			X	
Machine tools			X	
PPE	X			
Pressure	X			
Soldering			X	
Thermal			X	
Walking and working surfaces	X			
Welding			X	
Other Hazards:			X	
Radiation Protection				
Radioisotope Journal up to date			X	
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			X	
Exposure Control: shielding, dosimetry, PPE, food/drink			X	
Posting & Labeling: rooms, sinks, equipment			X	

		REVIEWED	
Equipment Authorization - Certification/calibration/logs	Yes	No	Not Obs/App
Autoclave			X
Biosafety Cabinet			X
Clean Room			X
Crane Hoist			X
Eyewash / Safety Shower			X
Fire Extinguishers (incl. Class D)			X
Flammables Cabinet/Refrigerator			X
Fork Lift / Heavy Equipment Operator			X
Fume Hood (calibration check up to date)			X
Glove Box (calibration check up to date)			X
Hand and Shoe Counter			X
Local Exhaust System			X
Monitoring / Alarm System			X
Photoprocessing Equipment			X
Sonicator			X
Ultracentrifuge			X
Other			X
Waste Management			
WAA compliance			X
SAA compliance (previously audited by LBNL Waste Mgmt)			X
Environmental Services			
Air emissions			X
Sanitary sewer discharge			X
Storage tanks - aboveground or underground			X
Storm water management			X
Treatment systems			X
Field Interviews			
Knowledge of authorizations, procedures, etc.	X		
Knowledge of safety systems	X		
On-the-job training	X		
Safety concerns, how to communicate concerns	X		
Comments			
<p>1. Principal Investigator not listed as user, and thus training not validated. This is an artifact of the electronic AHD system.</p> <p>2. Liquid nitrogen and liquid helium in the magnet are not listed in CMS, should be.</p> <p>OVERALL: No Findings, AHD is in Compliance</p>			
<p>Performed By: John Seabury Name / Signature</p> <p>Reviewed By: David Rodgers Name / Signature IFA Team Leader</p> <p>Date: 8/2/06</p> <p>Date: 9/11/2006</p>			

Appendix D - Field Inspection Guide

D5

Authorization Type: *RWA*Date: *06/07/06*Location(s): *B70/H7A ; B70A 1159A, 1159B, 1165, 1165A*Authorization Number/Reference: *RWA 1020**B70A 1129, 1145, 1145A, 1145B, 1149, 1151**David Shuh***REVIEWED***70A 2211, 2215,**2217, 2217B***Administrative**

	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other: <i>Active RWP in same location</i>			

Hazardous Work Permits

Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			✓
Fire Safety Permit			✓
Lock Out Tag Out (LOTO)			✓
Energized Work Permits (EWP - A, B)			✓
Permit to Penetrate Surface			✓

Work Area Occupational and Environmental Safety and Health

Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			

Radiation Protection

Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping	✓		
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment	✓		

Appendix D - Field Inspection Guide

[illegible]

Appendix D - Field Inspection Guide**D6**Authorization Type: *RWA*Date: *07/13/06*Location(s): *70A-2229A, 2229B, B74-2011*Authorization Number/Reference: *RWA1040**Patricia Durbin-Heavy***REVIEWED****Administrative**

	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:			

Hazardous Work Permits

Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			✓
Fire Safety Permit			✓
Lock Out Tag Out (LOTO)			✓
Energized Work Permits (EWP - A, B)			✓
Permit to Penetrate Surface			✓

Work Area Occupational and Environmental Safety and Health

Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			

Radiation Protection

Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping	✓		
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment <i>⁵⁹Fe in refrig, not on log / updated</i>	✓		

Appendix D - Field Inspection Guide

Equipment Authorization - Certification/calibration/logs	REVIEWED		
	Yes	No	Not Obs/App
Autoclave			✓
Biosafety Cabinet			
Clean Room			
Crane Hoist			
Eyewash / Safety Shower			
Fire Extinguishers			
Flammables Cabinet/Refrigerator			
Fork Lift / Heavy Equipment Operator			
Fume Hood			
Glove Box			
Hand and Shoe Counter			
Local Exhaust System			
Monitoring / Alarm System			
Photoprocessing Equipment			
Sonicator			
Ultracentrifuge			
Other			
Waste Management			
WAA compliance			✓
SAA compliance			✓
Environmental Services			
Air emissions			✓
Sanitary sewer discharge			✓
Storage tanks - aboveground or underground			✓
Storm water management			✓
Treatment systems			✓
Field Interviews - PI NOT INTERVIEWED			
Knowledge of authorizations, procedures, etc.			✓
Knowledge of safety systems			✓
On-the-job training			✓
Safety concerns, how to communicate concerns			✓
Comments			
<u>PI was not available. Jerry Bucher, DSC, was able to provide</u> <u>answers concerning research work, safety systems, documentation</u> <u>and training. Noteworthy.</u>			
Performed By: <u>Chui Domahue</u>		Date: <u>9/14/06</u>	
Name / Signature			
Reviewed By: <u>Dave Rogers</u>		Date: <u>10/6/06</u>	
Name / Signature IFA Team Leader			

Appendix D - Field Inspection Guide**D7**Authorization Type: **RWA**Date: **07/13/06**Location(s): **70A 1129, 1145, 1145B, 1149, 1151, 1159A, 1159B
70-147A (Pit Room) 606-ALS BL 11.3.1**Authorization Number/Reference: **RWA 1112****Linfeng Rao****REVIEWED**

Administrative	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:	✓		
Hazardous Work Permits			
Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			✓
Fire Safety Permit			✓
Lock Out Tag Out (LOTO)			✓
Energized Work Permits (EWP - A, B)			✓
Permit to Penetrate Surface			✓
Work Area Occupational and Environmental Safety and Health			
Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			
Radiation Protection			
Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping	✓		
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment	✓		

Appendix D - Field Inspection Guide

		REVIEWED		
Equipment Authorization - Certification/calibration/logs	Yes	No	Not Obs/App	
Autoclave			✓	
Biosafety Cabinet				
Clean Room				
Crane Hoist				
Eyewash / Safety Shower				
Fire Extinguishers				
Flammables Cabinet/Refrigerator				
Fork Lift / Heavy Equipment Operator				
Fume Hood				
Glove Box				
Hand and Shoe Counter				
Local Exhaust System				
Monitoring / Alarm System				
Photoprocessing Equipment				
Sonicator				
Ultracentrifuge				
Other			↓	
Waste Management				
WAA compliance			✓	
SAA compliance			✓	
Environmental Services				
Air emissions			✓	
Sanitary sewer discharge			✓	
Storage tanks - aboveground or underground			✓	
Storm water management			✓	
Treatment systems			✓	
Field Interviews				
Knowledge of authorizations, procedures, etc.	✓			
Knowledge of safety systems	✓			
On-the-job training	✓			
Safety concerns, how to communicate concerns	✓			
Comments				
ALS (06) BL 11.3.1 Not observed. Infrequent use; temporary posting.				
70-147A (Pit Room) Not observed. Storage area only (EH+S RWA)				
Performed By: <u>Christi Donahue</u>		Date: <u>9/14/06</u>		
Name / Signature				
Reviewed By: <u>Dave Rogers</u>		Date: <u>10/6/06</u>		
Name / Signature IFA Team Leader				

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D8

Authorization Type: RWA

Date: 07/13/06

Location(s): 70A-1145, 1145B, 1151, 1159A, 1159B, 2211, 2215, 2217, 2217B 74-144A

Authorization Number/Reference: RWA 1113

Wayne Lukens

REVIEWED

Administrative	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:			
Hazardous Work Permits			
Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			
Fire Safety Permit			
Lock Out Tag Out (LOTO)			
Energized Work Permits (EWP - A, B)			
Permit to Penetrate Surface			✓
Work Area Occupational and Environmental Safety and Health			
Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			
Radiation Protection			
Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment	✓		

70A-1159A updated
2211

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Appendix D - Field Inspection Guide**D9**Authorization Type: **RWA**Date: **07/13/06**Location(s): **70A-1129, 1145, 1145A, 1145B, 1149, 1159A, 1165
1165A, 2211, 2217, 2217B 70-147A (Pit Room)**Authorization Number/Reference: **RWA 1117****David Shuh****REVIEWED****BL 11.3.1 ALS**

Administrative	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:			
Hazardous Work Permits			
Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			✓
Fire Safety Permit			✓
Lock Out Tag Out (LOTO)			✓
Energized Work Permits (EWP - A, B)			✓
Permit to Penetrate Surface			✓
Work Area Occupational and Environmental Safety and Health			
Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			
Radiation Protection			
Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping	✓		
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment	✓		

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D10

Authorization Type: *RWA*Date: *07/13/06*

Location(s):

Authorization Number/Reference: *RWA1148**ALS - 11.0.2.2 7.0 8.0**David Shuh***REVIEWED**

Administrative	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:			
Hazardous Work Permits			
Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			
Fire Safety Permit			
Lock Out Tag Out (LOTO)			
Energized Work Permits (EWP - A, B)			
Permit to Penetrate Surface			
Work Area Occupational and Environmental Safety and Health			
Access and egress			✓
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			
Radiation Protection			
Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			✓
Exposure Control: shielding, dosimetry, PPE, food/drink			✓
Posting & Labeling: rooms, sinks, equipment			✓

Appendix D - Field Inspection Guide

	REVIEWED		
Equipment Authorization - Certification/calibration/logs	Yes	No	Not Obs/App
Autoclave			✓
Biosafety Cabinet			
Clean Room			
Crane Hoist			
Eyewash / Safety Shower			
Fire Extinguishers			
Flammables Cabinet/Refrigerator			
Fork Lift / Heavy Equipment Operator			
Fume Hood			
Glove Box			
Hand and Shoe Counter			
Local Exhaust System			
Monitoring / Alarm System			
Photoprocessing Equipment			
Sonicator			
Ultracentrifuge			
Other			
Waste Management			
WAA compliance			✓
SAA compliance			✓
Environmental Services			
Air emissions			
Sanitary sewer discharge			
Storage tanks - aboveground or underground			
Storm water management			
Treatment systems			
Field Interviews			
Knowledge of authorizations, procedures, etc.	✓		
Knowledge of safety systems	✓		
On-the-job training	✓		
Safety concerns, how to communicate concerns	✓		
Comments	<u>Administrative review only. No active work at ALS at time</u> <u>of walkthrough.</u> 		
Performed By: <u>Christi Donahue</u>	Date: <u>9/14/06</u>		
Name / Signature			
Reviewed By: <u>Dave Rogers</u>	Date: <u>10/6/06</u>		
Name / Signature IFA Team Leader			

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D11

Authorization Type: RWPDate: 07/13/06Location(s): 70A-1129 70A-1149Authorization Number/Reference: RWP-06-004David Shuh

REVIEWED

Administrative

	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other: <u>No active Work.</u>	✓		

Hazardous Work Permits

Confined Space Permit			✓
Energized Work Permits (EWP - A, B)			↓
Fire Safety Permit			↓
Lock Out Tag Out (LOTO)			↓
Energized Work Permits (EWP - A, B)			↓
Permit to Penetrate Surface			↓

Work Area Occupational and Environmental Safety and Health

Access and egress			✓
Biohazards			↓
Chemical Hygiene and Safety			↓
Chemical Management System status			↓
Compressed gasses			↓
Confined space			↓
Cryogenic			↓
Electrical			↓
Energy			↓
Ergonomic considerations			↓
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			↓
Elevated locations and guarding			↓
Lasers			↓
Lead			↓
Machine tools			↓
PPE			↓
Pressure			↓
Soldering			↓
Thermal			↓
Walking and working surfaces			↓
Welding			↓
Other Hazards:			↓

Radiation Protection

Radioisotope Journal up to date <u>N/A</u>			✓
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping			✓
Exposure Control: shielding, dosimetry, PPE, food/drink			✓
Posting & Labeling: rooms, sinks, equipment <u>N/A</u>			✓

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Appendix D - Field Inspection Guide

D12

Authorization Type:

SSA

Date:

July 13th 2006

Location(s):

B6. BL 9.0.2

Authorization Number/Reference:

210

REVIEWED

Administrative

	Yes	No	Not Obs/App
Authorization approved and signed	✓		
Authorization current	✓		
All users listed on authorization	✓		
All users trained in accordance with authorization requirements	✓		
Authorization accurately reflects work being conducted	✓		
Authorization posted / available in work area	✓		
Other:			

Hazardous Work Permits

Confined Space Permit			
Energized Work Permits (EWP - A, B)			
Fire Safety Permit			
Lock Out Tag Out (LOTO)			
Energized Work Permits (EWP - A, B)			
Permit to Penetrate Surface			

Work Area Occupational and Environmental Safety and Health

Access and egress			
Biohazards			
Chemical Hygiene and Safety			
Chemical Management System status			
Compressed gasses			
Confined space			
Cryogenic			
Electrical			
Energy			
Ergonomic considerations			
Exit Routes, Emergency Action Plans, and Fire Prevention Plans			
Elevated locations and guarding			
Lasers			
Lead			
Machine tools			
PPE			
Pressure			
Soldering			
Thermal			
Walking and working surfaces			
Welding			
Other Hazards:			

Radiation Protection

Radioisotope Journal up to date	✓		
Contamination/Inventory Control: meters, material storage, waste segregation, housekeeping	✓		
Exposure Control: shielding, dosimetry, PPE, food/drink	✓		
Posting & Labeling: rooms, sinks, equipment	✓		

Appendix D - Field Inspection Guide

	REVIEWED		
Equipment Authorization - Certification/calibration/logs	Yes	No	Not Obs/App
Autoclave			
Biosafety Cabinet			
Clean Room			
Crane Hoist			
Eyewash / Safety Shower			
Fire Extinguishers			
Flammables Cabinet/Refrigerator			
Fork Lift / Heavy Equipment Operator			
Fume Hood			
Glove Box			
Hand and Shoe Counter			
Local Exhaust System			
Monitoring / Alarm System			
Photoprocessing Equipment			
Sonicator			
Ultracentrifuge			
Other			
Waste Management			
WAA compliance			
SAA compliance			
Environmental Services			
Air emissions			
Sanitary sewer discharge			
Storage tanks - aboveground or underground			
Storm water management			
Treatment systems			
Field Interviews			
Knowledge of authorizations, procedures, etc.	✓		
Knowledge of safety systems	✓		
On-the-job training	✓		
Safety concerns, how to communicate concerns	✓		
Comments	Well organized project.		
Performed By: <u>D. Kestell / D. J. Laster</u>	Date: <u>10/06/06</u>		
Name / Signature			
Reviewed By: <u>David Rogers</u>	Date: <u>10/06/06</u>		
Name / Signature IFA Team Leader			

Appendix E Findings and Observations

Appendix E1 AHD Findings and Observations (CSDIFA06 App E1 AHD.pdf)

Appendix E2 RWA/RWP/SSA Findings and Observations(CSDIFA06 App E2 RWA.pdf)

Appendix E1
Findings and Observations
AHD's

Item No.	Building & Room #	Description of Finding (#'d items) or Observations (lettered items)	Regulation or Policy Citation	Recommendation or Corrective Action	Entered CATS? Y/N
	Findings				
1	AHD 2069	HCL and HBr were added to the AHD as covered gases but this was not reviewed by EHS. This constitutes an unreviewed change in scope.	Appendix A of the AHD requires that all changes to the list of gases be made with the concurrence of EHS	EHS verbal approval was obtained for the change. This AHD is being revised in the new electronic system, and formal approval for the new gas list will be documented.	Y - #2982
	Observations				
A	AHD 2026	The proposed sand technique for deactivating sodium has never formally been made part of the AHD.	Appendix D of PUB-300 requires that all significant changes to hazards or techniques require approval from EHS.	Discussions with EHS on this technique change had indicated that it was acceptable, however the AHD was never revised to include it. This AHD is being revised in the new electronic system and formal approval will be documented.	N
B	AHD 2069	Inventory of some health-hazard gases that are not listed in the AHD and are not being used, should be disposed of	This is a general housekeeping issue as opposed to a specific AHD problem.		N

Appendix E1
Findings and Observations
AHD's

Item No.	Building & Room #	Description of Finding (#'d items) or Observations (lettered items)	Regulation or Policy Citation	Recommendation or Corrective Action	Entered CATS? Y/N
C	AHD 3022	The PI is not listed as a user in the new AHD database, and so training is not validated.	Documentation of training is required for all AHD users.	This is due to fact the new AHD database keeps track of training by user and does not include the PI as a user automatically. The issue should either be addressed by revising the new AHD system, or by the users learning the idiosyncrasies of the system as more of the AHD's are entered.	N
D	AHD 3022	Liquid nitrogen and liquid helium used in the NMR magnet are not listed in the Chemical Management System.		This was due to confusion regarding the need for listing cryogenic liquids in the CMS. The issue was clarified by the CMS prgram manager.	N

Appendix E2

Findings and Observations

RWA/RWP/SSA

Item No.	Building & Room #	Description of Finding (#'d items) or Observations (lettered items)	Regulation or Policy Citation	Recommendation or Corrective Action	Entered CATS? Y/N	Photo Ref.
	Findings - No findings were identified					
	Observations					
A	RWA 1020	Excellent RWA compliance and user survey documentation.	n.a.	n.a.	n.a.	
B	RWA 1040	Fe-59 found in refridgerator that had not been updated on the log.	EHS 707	The label on the storage refridgerator was updated with the Fe59 content.	N	
C	RWA 1113	Poor housekeeping in 70A-2211	n.a.	P.I. informed	N	
D	RWA 1113	Freezer label out of date in 70A-2211	EHS 707	Corrected on the spot.	N	